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ABSTRACT

A school construction guide offers key personnel in school development projects information on the complex task of master planning and construction of schools in Australia. This chapter presents the appendix for the complete guide and contains summary statements of important procedures outlined in the earlier chapters. Included are outlines of educational business plans, terms glossary, site selection approval guide, value management resources, governmental capital funding, state government funding schemes, anti-graffiti methods, project management guidelines, and typical contract documents. (GR)

School Buildings

Planning, Design and Construction

John H Odell FRAIA ASIC
in association with the
Association of Independent Schools of NSW Ltd

8 APPENDICES

School Buildings, Planning Design and Construction is presented in a ring binder with 8 booklets. The document is available only as a complete set

ISBN 0 646 23758 6 refers to the complete set of 8 booklets

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Epping NSW, Australia

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School Buildings - Planning, Design and Construction

A Guide Document

for School Councils, Boards and Committees, School Principals and Staff and Construction Professionals

Author - John H Odell FRAIA ASTC

Introduction to

School Buildings – Planning, Design and Construction

Good school buildings do not just happen. Thought and consideration must be given to the needs of the users of the building and to the available resources. The persons responsible for building the school should have considerable experience or draw on the advice of those who have.

For a building to be satisfying and successful it must provide shelter, have durable construction and finishes, be aesthetically pleasing and appropriate to its use. A well-planned school will incorporate the following points:

- buildings and grounds will satisfy and support both short and long-term requirements
- curriculum demands including requirements for registration by authorities will be met
- site development will not be haphazard and each project will pave the way for the next
- building design will be flexible to cater for as yet unknown future requirements
- building will be cost effective - and in the long term the school will avoid unnecessary expensive recovery action
- good building design will encourage a high quality educational environment
- pre-planning of maintenance requirements will assist in reducing operating costs

This guide is designed to assist key personnel in school development projects with the complex task of master planning and construction of schools.

Individual chapters in this guide may be distributed to relevant key personnel as appropriate to their specific interest and responsibility.

Each chapter is a separate booklet with chapters 7 and 8 bound together in one booklet and chapter 9 in booklet 8.

The chapters:

1 Developing a Master Plan for Your School
2 Making the Most of Your School Site
3 Principles of Good School Building Design
4 Purpose Designed Facilities
5 Construction Methods and Materials
6 Managing the Construction Process
7 Technology and Educational Buildings
8 Managing School Buildings
9 Appendices

This Guide aims to:

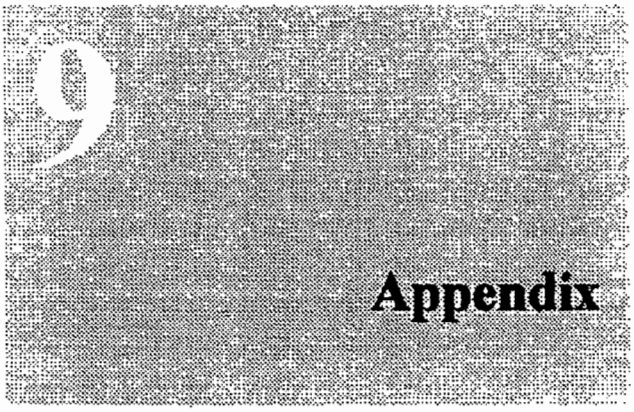
- demonstrate the necessity for school communities to produce comprehensive master plans for the development of their school
- encourage school staff and boards to be involved in the development of school facilities and to draw on the wider experience of the community during that process
- outline planning processes and techniques that will lead to greater creativity in school design with greater efficiencies and productivity in the construction process
- help school staff and board members in their dealings with professionals in the building industry, and vice versa
- encourage excellence in school facilities
- maximise potential of limited resources to achieve desirable outcomes
- provide advice on how to determine whether a particular facility is vital to a school
- provide examples of excellence in school building and planning
- provide a comprehensive list of contacts, resources and references.

Who should read this Guide:

- All school council/board members
- Principals, bursars and other key staff members
- All members of school building and planning committees
- Administrators in control of school building projects
- Construction industry professionals, especially school architects

Contents of Booklet 8

9. Appendix



9. Appendix

This part of the Guide Document contains summary statements of important procedures outlined in the earlier sections.

Here is a list of the various appendices:

9.1. Educational and Business Plans – Outlines

9.1.1. Educational Plan Outline

The following is a suggestion as to what might be expected in a typical Educational Plan. The arrangement will not at all be typical, but the essential elements which a Master Planning Team (MPT) might look for are listed. As indicated in the main document the MPT will not need the Plan itself, rather a summary of it as set out in Chapter 1.

The elements:

School Philosophy

The school philosophy normally describes the purpose in establishing the school and how the education process relates to that purpose, the particular approach to education, nature of human relationships and the like. A secular school would have quite a different perspective on the nature of schooling, for example than would a Christian school or a school for Muslim families. This will have a bearing on the kinds of spaces provided and the disposition of those spaces.

School Aims and Objectives

The school should have clearly and succinctly stated aims (goals and general direction) and objectives (specific targets to be achieved within a specified time frame).

Educational strategy

The Educational Strategy will include such matters as curriculum content, school size, class size, teacher student ratio, teaching day, ancillary staff, grade structures (such as whether the school will have divisions according to age, family based groupings, vertical groupings), the proposed availability and distribution of resources and equipment, the degree to which electronic equipment will feature in classroom and support rooms, etc.

The components of the educational Strategy might include the following:

- the instructional plan - the subjects to be included, how courses will be offered and at what levels, (e.g. will students sit the HSC, will alternate pathways to HSC be offered),
- the organisational plan - a system to promote and support the instructional plan, optimum class sizes, style of teaching, organisation of subject matter (e.g. will all topics be taught in relative isolation or will there be an attempt at integrating knowledge and learning as in the Steiner education model)
- the personnel plan - the staff required to implement the instructional program, criteria for selection of staff, programs for orientation
- the evaluation plan - the means of assessing students' performance and of reporting performance to parents

- the support plan - the resources and services needed and available for the instructional plan, (e.g. the levels of technology to be adopted)

The success of the planning process relies heavily on the accuracy and thoroughness of this process. This work is primarily that of the educational professionals but it must be offered in a format for the lay reader. Both School Council and Planning Team must be able to read and understand the essence of this material if they are to contribute competently to the planning of the school facilities.

9.1.2. Business Plan Summary

Below is a summary of some of the issues which might be dealt with in a Business Plan for a school:

Demographic Analysis

Demographics is the study of population trends in a community. Demographic analyses are particularly relevant to schools as they provide vital information as to the school's potential market.

The demographics of the drawing area will have a bearing on the school's promotional program, its staffing program as well as it's anticipated growth potential.

The rate of growth for the school will have a direct bearing on the basic layout and the need for buildings. A school which will achieve maximum enrolment in a short time can build most of its facilities at once - a school which is growing over a period of years can not afford to have facilities lying dormant.

Demographic data may be obtained from State Government Planning Agencies, Local Councils and other agencies such as the Bureau of Statistics.

It is also recommended that schools undertake their own demographic studies to supplement public information. For new schools it is essential to try to estimate market share by holding public meetings, seeking expressions of interest from parents etc..

Enquiry History

In the case of an existing school the enrolment trends to date will be very useful in projecting future growth. Schools which keep accurate records of enrolment applications, the date they are received and the percentage which result in confirmed enrolment will be in the best position to be able to forecast future trends. This is made comparatively simple if data base records are established as part of the enrolment process commencing with the initial application.

Financial Plan

The Financial Plan will be a detailed statement projecting income and expenditure patterns over a period of 5 years or more. It requires a fundamental understanding of school funding, including funding policies of government bodies and agencies. For example school financial planners should be aware of the Commonwealth

Government's current funding formula for recurrent grants - the Education Resources Index (ERI) and the impact on this formula of particular school income and expenditure decisions.

Advice should be sought from State AIS, CEO or Block Grant Authority offices (see Appendix 9.3) with regard to likely trends in Government funding patterns.

The financial plan will also need to address issues such as:

- capital debt repayment policies
- borrowing capacity
- financial controls
- fee levels and discounts, assistance with capital projects through grants, loans and interest subsidies

Promotion

A plan for the promotion of the school will have some relevance to planning for capital projects - the building program itself may well be part of the promotion strategy.

Overall strategy

On the basis of the above an overall strategy can be developed for

- the recruiting of staff and enrolment of students
- a program for the commencement of a school or to increase existing enrolments
- the construction of buildings; note that the rate of growth and type of facility required will vary between primary and secondary schools. The latter are more complex and require more specialist facilities - increasingly so in senior secondary grades.

Contingency plan

A contingency plan to cater for unexpected changes in growth patterns, major changes in education policy etc., is wise. Changes of this nature, particularly in growth phases where borrowings are usually very high can effect the viability of a school.

Such plans help minimise risk and encourage greater lending assistance.

The contingency plan with respect to facilities may include devising alternative uses for buildings, moving buildings off site, subdividing rooms, changing the site itself etc..

9.2. Glossary

Aesthetics	Having to do with an appreciation of beauty, conforming to principles of good taste.
Acoustics	The science by which sound can be analysed and predictions can be made about the performance of materials in reinforcing or reducing sound in and through spaces or materials.
Architect	A person may only be described as an architect if they are appropriately registered as an architect under the provisions of the various State Government laws and regulations.
As-built	Drawings and sometimes photographic records to illustrate the building as it was in fact built. These records are important because changes from the original contract documents are often necessary.
BCA	Building Code of Australia - the current regulations governing building construction.
Berm	An embankment formed to screen from view or to deflect sound and/or water.
Block Grants	Commonwealth Government funds made available to non-government schools for the establishing of capital projects.
BGA	Block Grant Authority - established as an agency of the Commonwealth Government to assess applications for capital funds and to make recommendations to the Commonwealth.
Brief	A structured presentation of the requirements of the client or user of a building project, expressed in both words and numbers as well as diagrams to establish the criteria to be met in the design.
Building Services	Refer to **Services**
CAD	Computer Aided Drafting or Design
Conduit	A pipe through which cables are drawn and are thus protected. These can be buried in the ground or be exposed on walls but are usually hidden for aesthetic reasons.
Consultants	People with appropriate qualifications to advise on aspects of design and construction, usually with tertiary qualifications and belonging to professional associations.

Contract Documents The working drawings, specification and contract conditions on which contractors form an opinion as to the cost and which form the basis of a building contract.

DEET Department of Employment, Education and Training - a Commonwealth Government instrumentality to fund and administer schools.

Demographics A description of the population trends and age ranges of a particular community along with an attempt to forecast the likely population trends.

Echo The discernible and discrete repetition of sound within a space.

Exits In terms of Building Code requirements not all external full height openings (doorways) are required exists. Those that are, need to conform to certain regulations regarding location, size and means of locking and opening.

Footings The lowest part of the structure on which the rest of the building rests. The footings rest on the foundations.

Foundations The material in the ground on which the structure is to be built - if not rock then it will more than likely be a stable material such as shale or non-reactive clay.

Globals A formula used by the Commonwealth Government to assist in determining eligibility for capital grants.

Hardware Door handles, hinges, door closers, towel rails, cupboard catches and the like.

Hose Reels Reels to which are fitted small (but larger than a garden hose) diameter hoses and nozzles, installed as part of the fire-fighting installation. They are capable of being used by untrained personnel.

Hydrants Large diameter pipes either below or above the ground with connections to facilitate connection of fire-hoses, installed as part of the fire-fighting installation either in the street or within large building complexes such as schools. Their location is regulated by building codes and fire-fighting authorities.

Industrial Technology A collection of skills and knowledge bases taught in schools as part of the preparing of students for the work environment and as part of the process of developing understanding as to the nature of materials and how they may be manipulated and fabricated.

Life-cycle The term is used generally in relation to assessing the cost of a material or piece of equipment taking into account all costs from preparation and purchase to the point where the item needs to be replaced

Microwave link	A means by which data can be transferred by means of high frequency electromagnetic signals - sent and received by dish shaped antennae.
Middle School	The group of classes between early primary and late or senior secondary - thus forming three divisions of classes in schools catering for all years of formal schooling.
OECD	Organisation for Economic Co-operation and Development 2rue Andre-Pascal, 75775 Paris Cedex 16, France Refer Appendix 9.7 for further details including local contact.
Quantity Surveyor	A person usually with tertiary qualifications employed and skilled to measure the quantity of materials to be used in a building project and to forecast costs and manage budgets.
Relocatable	Sometimes referred to as demountable or transportable building - a building capable of being moved from one site to another, usually constructed in a factory and brought to the site in a practically finished state.
Reticulation	The system for distributing fluids such as water, gas or energy (power or data/voice) around a site or building.
Reverberation	The continuing of sound after the source of the sound is no longer operating. Like an echo but the sound is not discrete.
Reverse-cycle	A form of air-conditioning which provides both heating and cooling, drawing from or "dumping" heat into the atmosphere to modulate the temperature within the building to acceptable levels.
Rise and Fall	A formula often used in construction contracts to modulate the contract price in relation to changes in wages and/or cost of materials.
Runnel	A channel usually in a science bench top as an alternative to using individual sinks for disposing of waste water and chemicals.
Sanitary drainage	Pipework for the disposal of sewage or waste water - referred to as "sanitary" due to the health requirements for the health-safe transit of such fluids.
Services	The supply and disposal systems of the building. These supply energy for power and light, fresh and cooled or heated air, water, security, and the systems needed to dispose of waste water, foul air or gases.
Sewage	Waste water from kitchens, bathrooms and toilets. Must be treated differently and kept separate from stormwater.

Sewerage	The system of pipes and ancillary equipment for conveying sewage and treating it.
Stormwater	Water falling on or flowing over land and buildings directly or indirectly from rain. Must be treated differently and kept separate from sewage.
TAFE	Technical and Further Education
Tendering	The process of obtaining competitive prices for a project.
Terrain	A tract of land with particular and distinctive features.
Topography	A means of describing the formation of land, changes in level, waterways and the like.
Value Management	A disciplined process of evaluation of a process or design to ensure the best possible value is achieved.
Zoning	A device used by town planners in the local government context to regulate the kind of development which may or may not be permitted in the various areas of the town, municipality or shire.

9.3. Block Grants Authorities

The Commonwealth Government Capital funding program is administered by various Block Grant Authorities (BGA) in the states as agents of the Commonwealth Government. Schools are encouraged to be linked with the relevant group in their state and apply for capital grants through them. The BGA's operate under guidelines established by the Commonwealth. They make recommendations to the Commonwealth as to the school's eligibility and entitlement after analysis based on inquiry and information provided by the school in their application.

Applications are usually called for quite early in each year and recommendations are usually completed by the end of September. The Commonwealth Minister makes the final decision on offers of grants to schools.

Schools considering making application for a capital grant should in the first instance . ake contact with the relevant BGA in their State as to membership and then for application forms. Documentation required by the BGA is comprehensive and covers both project details and financial matters in order to assess the need of each school in relation to the demand which is often greater than the resources available.

The BGA's are available to provide advice and information as to how the program operates. A number of BGA's offer additional consulting services to schools on a fee for service basis.

Block Grant Authorities

New South Wales

Association of Independent Schools of
NSW Block Grant Authority Ltd
Level 9, Reid House
75 King Street
SYDNEY NSW 2000

Phone (02) 299 2845
Fax (02) 290 2274

New South Wales Catholic Block Grant Authority
PO Box A169
SYDNEY SOUTH NSW 2000

Phone (02) 287 1555
Fax (02) 264 6308

Victoria

Victorian Independent Schools BGA Limited
20 Garden Street
South Yarra VIC 3141

Phone (03) 826 6765
Fax (03) 826 6066

Victoria (continued)

Catholic Capital Grants (Victoria) Ltd
PO Box 146
EAST MELBOURNE VIC 3002

Phone (03) 665 0333
Fax (03) 663 4417

Queensland

Independent Schools of Queensland
Block Grant Authority Pty Ltd
AISQ House
122 Fortescue Street
SPRING HILL QLD 4000

Phone (07) 839 2142
Fax (07) 839 2158

Queensland Catholic Block Grant Authority
Queensland Catholic Education Commission
GPO Box 2441
BRISBANE QLD 4001

Phone (07) 224 3333
Fax (07) 229 0907

Western Australia

AISWA Capital Grant Association
Suite 3, 41 Walters Drive
Herdsman Business Park
OSBORNE PARK WA 6017

Phone (09) 244 2788
Fax (09) 244 2786

Catholic Education Commission of WA
Trustees Association Inc (BGA)
PO Box 198
LEEDERVILLE WA 6007

Phone (09) 388 4388
Fax (09) 381 3201

South Australia

ISB Block Grant Authority Inc
301 Unley Road
MALVERN SA 5061

Phone (08) 373 0755
Fax (08) 373 1116

South Australia (continued)

South Australian Commission for
Catholic Schools Inc (BGA)
Catholic Education Office
GPO Box 179
TORRENSVILLE SA 5031

Phone (08) 301 6600
Fax (08) 301 6611

Tasmania

Independent Schools Block Grant Authority of
Tasmania Pty Ltd
PO Box 1845
LAUNCESTON TAS 7250

Phone (003) 34 1908
Fax (003) 34 2017

Tasmanian Catholic Block Grant Authority
PO Box 102
HOBART TAS 7002

Phone (002) 31 1033
Fax (002) 31 1793

Northern Territory

Northern Territory Block Grant Authority
GPO Box 4519
DARWIN NT 0801

Phone (089) 84 3833
Fax (089) 47 1517

Australian Capital Territory

ACT Block Grant Authority
PO Box 1483
WODEN ACT 2606

Phone (06) 285 1808
Fax (06) 285 1860

Seminars and literature

A number of the BGA's and/or independent schools associations conduct seminars for those interested in capital development programs, in particular in relation to capital grant applications. Enquire of the relevant association as to if and when such seminars may be operating.

The author is available to contribute to such seminars.

9.4. Site Selection Approval Guide

On this and the following page a process for evaluating sites under consideration for a school is outlined. Firstly in this page a matrix to assess the various aspects of a particular site. On the next page a matrix to assist in making objective comparisons across a range of sites. The next page also contains some factors which will assist in making the evaluation.

This information is used by permission from the

Council of Educational Facility Planners, International
8687 E. Via de Ventura, Suite 311 Scottsdale, AZ 85258-3347

The information is taken from The Educational Facility Planner - School Site Problems and Solutions - Volume 31 Number 6 - 1993 pages 11 and 12. Some changes to the information on the following page have been made to align with terminology used in Australia.

SITE REVIEW ANALYSIS

After the team has considered the criteria the following worksheet should be used to rank each site. The number of points assigned to each factor is based on the experiences of the consultants in the School Facilities Planning Division.

NOTE: A score of zero on a critical factor such as safety, for example, indicates that the negative aspects of the factor could not reasonably be mitigated. Therefore, the site should be eliminated from consideration, regardless of potential high scores on other factors.

Site Identification: Location:	Gross Acres:			Grade Levels: Estimated Value:		
FACTORS	**0 1**	**2**	**3**	**4 5**		**TOTAL**
Safety (20 possible points)	DANGEROUS			SAFE		x4 =
Location (15 possible points)	REMOTE			CONVENIENT		x3 =
Environment (10 possible points)	POLLUTED			CLEAN		x2=
Soils (10 possible points)	UNSUITABLE			SUITABLE		x2 =
Topography (10 possible points)	UNSUITABLE			SUITABLE		x2 =
Size and Shape (10 possible points)	INADEQUATE			ADEQUATE		x2 =
Accessibility (10 possible points)	OBSTRUCTED			ACCESSIBLE		x2 =
	0 1	**2**	**3**			**TOTAL**
Public Services (3 possible points)	UNSERVICED		SERVICED			x1 =
Utilities (3 possible points)	UNAVAILABLE		AVAILABLE			x1 =
Cost (3 possible points)	EXPENSIVE		ECONOMICAL			x1 =
Availability (3 possible points)	EASY		DIFFICULT			x1 =
Political implications (3 possible points)	CONFLICT		HARMONIOUS			x1 =
				TOTAL POINTS (100 Possible)		

SITE EVALUATION SUMMARY

FACTORS	POSSIBLE POINTS	SITE IDENTIFICATION				
SAFETY	20					
LOCATION	10					
ENVIRONMENT	10					
SOILS	10					
TOPOGRAPHY	10					
SIZE AND SHAPE	10					
ACCESSIBILITY	10					
PUBLIC SERVICES	3					
UTILITIES	3					
COST	3					
AVAILABILITY	3					
POLITICAL IMPLICATIONS	3					
TOTAL POINTS	100					

SITE REVIEW CONSIDERATIONS

Safety (Factors to avoid)

- Adjacent to highways and railway and lacks sound buffer
- Within 3km of an airport runway or heliport
- Close to high voltage power lines
- Contaminants or toxic wastes in the soil or groundwater from landfill, dumps, chemical plants, or agricultural use of pesticides or fertilisers
- Close to open-cut mining
- On or near a fault zone or active fault
- In a flood-prone area of dam or flood plain
- Social hazards in the neighbourhood such as high incidence of crime and drug or alcohol abuse

Location

- Strategically located to avoid extensive transporting and to minimise student travel distance
- Compatible with current and future zoning regulations
- Close to public services, such as libraries, parks and museums
- Favourable orientation to wind and natural

Environment

- Free from sources of noise that may impede the instructional process
- Free from air pollution, smoke, dust, and odours
- Provides aesthetic view from and of the site
- Compatible with the curriculum

Site Review Considerations Continued

Soils

- Proximity to fault lines or fault traces
- Stable subsurface and bearing capacity
- Danger of slides or liquefaction
- Percolation of septic system and drainage
- Adequate water table level
- Existing land fill reasonable compacted. NOTE: A geologic test must be conducted to determine soil conditions

Topography

- Surface and subsurface drainage
- Rock ledges or outcropping
- Feasibility of mitigating steep grades
- Level area for playing fields

Size and Shape

- Net areas consistent with recommendations of School Facilities Planning Division's School Site Analysis and Development Guide (in Australia use DEET Guide - see paragraph 2.1.8)
- Appropriate length to width ratio
- Sufficient open play area and open space
- Potential for expansion for future needs
- Adequate and separate bus loading and parking

Accessibility

- Access and dispersal roads
- Natural obstacles such as grades or gullies
- Obstacles such as crossings on major streets and intersections, narrow/winding streets, heavy traffic patterns
- Freeway access for bus transportation
- Pedestrian traffic patterns

9.5. Value Management Resources

The concept of Value Management is outlined in chapter 1 (1.7).

There are a number of resource personnel and organisations which are available to help schools who may want to conduct a Value Management Study of their project.

Institute of Value Management Australia
Contact Alan Butler - (02) 372 8026 for list of registered members of the Insititute.

National Centre for Value Management (Canberra)
University of Canberra
PO Box 1
BELCONNEN ACT 2616

Contact Professor Roy Barton

Phone (06) 201 2572
Fax (06) 201 5034

National Centre for Value Management (NSW)
Level 15 McKell Building,
2-24 Rawson Place
SYDNEY NSW 2000

Contact Alan Butler

Phone (02) 372 8026
Fax (02) 372 8033

Page, Kirkland, Tierney
Value Management Consultants
Level 3, 38 Oxley Pl
ST LEONARDS NSW 2065

Contact Declan Tierney

Phone (02) 906 8334
Fax (02) 906 8337

While the following is not a resource for Value Management the facilities provided may assist in decision making by means of electronic recording of discussions and collaboration using sophisticated computer software and hardware.

Decision Support Centre
66 Berry St,
NORTH SYDNEY 2060
Contact John Milford or Doug Naylor
Phone (02) 957 6521

9.6. Schools Visited or Forming Part of Study

All Saints Anglican, Merrimac, Qld

Bayswater North Primary, Vic

Belmont Christian Community School, NSW

Beaconhills Christian College, Packenham, Vic

Bega Valley Christian Partent Controlled School, NSW

Billanook College, Mooroolbark, Vic

Caloundra Christian Community School, Caloundra Qld

Cape Byron Rudolph Steiner School, Cape Byron, NSW

Christian College, Highton, Geelong, Vic

Cornerstone College, Mt Barker, SA

Faith Lutheran, Tanunda, SA

Golden Grove Lutheran, Wynn Vale, SA

Good Shepherd Lutheran, Noosa, Qld

Green Point Baptist, Christian Community School, NSW

Heathdale Christian College, Werribee, Vic

Immanuel College, Novar Gardens, SA

Kena Kena Primary School, NZ

Kings Christian College, Mudgeeraba, Qld

Lindisfarne Anglican College, Terranora, NSW

Moreton Bay College, Wynnum, Qld

Morialta High School, SA

Mt District Christian School, Monbulk, Vic

Mt Eliza High School, Vic

Mueller College, Redcliffe, Qld

New Leith Academy, Edinburgh, Scotland

Northside Christian College, Bundoora, Vic

Overnewton College, Keilor, Vic

Pacific Hills Christian School, Dural, NSW

Penrith Christian School, Penrith, NSW

Pilgrim School, Aberfoyle Park, SA

Plenty Valley Christian School, Plenty Valley, Vic

Portside Christian School, Ethelton, SA

Redlands Christian College, Redlands, Qld

Roseville College, Roseville, NSW

Samford Valley Steiner, White Mountain, Qld

St Marys Christian School, St Marys, NSW

Temple College, Mile End, SA

Trinity College, Gawler, SA

Tuggeranong College, ACT

Waldorf School, Mt Barker, SA

Woori Yallock Primary School, Vic

Yarra Valley Anglican School, Vic

9.7. References

Literature in relation to school buildings is fairly prolific, but not always readily available. This Guide Document aims to be a source document or digest and directory as well as provide an overview of a planning process to achieve a successful school building project.

This Appendix lists most if not all of the documents referred to in the main text as well as other material that Master Planning Teams may find useful.

Schools Commission

In the early days of the Schools Commission some very useful documents were produced. Some of these are still being used. The very positive response to a new and updated resource document has been a clear indication of the need for such a study.

Some of the topics covered in Schools Commission documents are:

- Guidelines for General School Buildings September 1975
- Planning and Managing a School Building Projects December 1976 ISBN 0 6440 1871 2
- Cost Planning - Preparing a Budget December 1976
- Books and Beyond (Second Edition) – 1979
- Schools Design and Use – 1982 Australian Government Publishing Service
- Science Learning Areas in Australian Schools – 1982
- School and Community Facilities - how to make the best use of available resources – 1981
- Comparative Suitability of materials and finishes for schools in Australia - 1982 ISBN 0 644 02228 0

DEET Literature

Each year the Commonwealth Department of Employment, Education and Training publish a book under the title Commonwealth Programs for Schools - Administrative Guidelines. It contains important information regarding recurrent and capital funding programs and is essential information for key people in the Master Planning Team, in particular the Financial Sub-group.

Catholic Education Commissions

The Catholic Schools peak body in Queensland, Queensland Catholic Education Commission has provided excellent leadership in holding a seminar in 1991 drawing together expertise from various parts of Australia. It is referred to as the "Proceedings of the Conference on the Capital Needs of Catholic Schools".

The seminar summary would be a useful tool for all schools and a valuable supplement to this Guide Document.

OECD Literature

The Organisation for Economic Co-operation and Development operates a program referred to as PEB/Programme on Educational Building. Regular seminars are held in various parts of the world and each focuses on a specific issue. These seminars are summarised in booklets available through the distributors:

Bookshop - 33 rue Octave-Feuillet 75016 Paris

Australia - DA Information Services 648 Whitehorse Road
POB 163 Mitcham, Victoria 3132
Phone (03) 9873 4411 Fax (03) 9873 5679

DA Information Services carry stocks of all current material and get other published material in 4-6 weeks.

Topics such as the following have been published and may be still available. If not try local Schools Association offices.

- The will to manage energy in Schools - Vienna May 1984
- Maintenance of Educational Buildings Policies and Strategies - Belgium October 1985
- Building implication of New Information Technology Dumblane Scotland - Sept 1985
- Application of Economic Appraisal to Educational Building - October 1986
- Educational Space Requirements and the Effective Use of Resources - Lysebu, Norway May 1986
- Greater Institutional Responsibility for Educational Property Management - Cambridge September 1986
- Schools as part of a Network of Learning Facilities Implications for Educational Buildings - Segovia, Spain December 1986
- Safety and Security in Educational buildings - Semmering, Austria May 1987
- Time for Change - Organisation of School time and implications for Building - October 1987
- Adaptability and Flexibility in Educational Facilities - Leicester June 1989
- New Technology and its impact on Educational Buildings - LETA Conference Adelaide Australia 1994
- Redefining the Place to Learn - A Study of Technology and the Design of the Learning Environment by Susan Stuebing 1994

OECD conduct a parallel program referred to as Program on Educational Building - Long Term Perspectives. Publications in that series to hand are:

- Information Technology by Hirokuni Taniguchi - 1987
- Individual Learning Harvard College, Prince Edward Island - 1987
- Golden Grove a Secondary Education Complex in South Australia - 1989
- Year Round Schools An example from the United States - 1986

- Information Technology
  Its impact on Japanese School Design - 1987
- The Alford Information Technology Centre - 1989

As part of the PEB program a newsletter type publication is issued called PEB Exchange. These cover a range of topics in each issue with the intent of exchanging information and experience on current research, projects and developments in the field of educational building. Countries participating include Australia, United Kingdom and a number of European countries.

Architectural magazines

Not readily available to the public but available if sought out are magazines such as

- Architecture in Australia
- Overseas magazines such as Aujourd Hui, Architectural Record, Architectural Forum and the like which from time to time feature educational buildings.

Architecture in Australia is the official journal of the Royal Australian Institute of Architects. Subscriptions are available through;

Architecture Media Australia Pty Ltd
4 Princes St, Port Melbourne Vic 3207
Phone (03) 9646 4760 Fax (03) 9646 4918

State Government Department Guideline Documents

The Department of School Education and Department of Public Works in New South Wales have produced jointly a series of Guides for Primary and Secondary School planning. These are designed for use by architects consulting in the design of government schools. They give comprehensive and detail plans for most if not all school spaces.

Likewise relevant government departments have done similar work in other states with varying levels of availability.

In the first instance check with the local BGA to determine if any such material is available for reference. Then check to determine if there are any limitations on the use of this information in the design of non-government schools.

Spaces for Learning - An Educational Specification for Primary Schools in NSW - 1979

This is a non-technical general guide. It does not provide quantitative information.

Curriculum Requirements

The Board of Studies of NSW has published a number of booklets outlining curriculum requirements for education programs Kindergarten to Year 12. The latest version of these documents will be an essential component of the documentation on which the Master Planning Team will need to operate, in particular the Educational sub-group.

These documents will provide a guide as to the subject matter and therefore the environment required in the school.

NSW Government interest Subsidy

Schools in NSW are eligible to apply for subsidy on the interest component of the cost of capital projects.

In order to be eligible space allocation must comply with the guideline areas unless some drop in level of subsidy is expected These guideline areas are published in a booklet available from the

Director of Finance
Department of School Education
6th floor, Signature Tower
2-10 Wentworth Street
Parramatta NSW 2150

Council of Educational Facility Planners, International

This organisation is based in Arizona, USA and has produced a number of documents which would be useful to Master Planning Teams.

- The Guide for Planning Educational Facilities
- The Computer Facilities Guide
- The Guide for School Facility Appraisal
- Educational Facility Planner (Annual Subscription)
- CEFPI Consultants Directory
- CEFPI 1993 Design Portfolio

The above documents area available from:

Council of Educational Facility Planners International
8687 E Via de Ventura, Suite 311
Scottsdale, Az 85258-3347
phone International area code + (602) 948 2337
fax International area code + (602) 948 4420

Books

School Ways – The planning and Design of American Schools
Ben E Graves
An Architectural Record/McGraw-Hill Professional Group Book
Edited by Clifford A Pearson
ISBN 0 07 002468 5
Published 1993

Technical Literature

EBS Bulletin 8 - Sunshine and Shade in Australasia
R O Phillips B Arch ARAIA
Australian Government Publishing Service Canberra 1983
Fourth Edition

This is a useful document in determining the direction and angle of the sun's rays at any time, any location throughout Australia, New Zealand, New Guinea and adjacent islands

Energy information

Solar Energy and Building by S V Szokolay

Published by Edward Arnold (Aust) Pty Ltd, Melbourne
1979 ISBN 0 7267 1008 3
This is a technical document but with many sketches illustrating ways to minimise energy use and maximise the use of solar energy.

Building Energy Manual

Produced by State Projects - the professional services arm of the NSW Public Works, for the Office of Energy.
Published 1993
ISBN 0 7310 0909 6

The Energy Guide

This is principally designed for use by householders but contains much useful information applying to the use of energy in schools, in particular as to how to conserve energy use.

Australian Government and Australian Consumers' Association
ISBN 0 644 12565 5

Victorian Independent Schools BGA Limited - Documents

The VIS BGA have produced a number of monographs on a variety of subjects related to capital projects and are available on application.

- Report on School Library Facilities with particular reference to the Victorian Certificate of Education - Irene Terry, June 1992
- A Model for the Assessment of School Computer Needs - Des Parker, August 1993
- A Survey of the Use of Technology in Schools - Des Parker, October 1993
- Research Paper on a Model for a Curriculum Centre for St Margaret's School - May 1994
- Research Project Report - Evaluation of Projects funded under the QC&TS Element of the Capital Grants Program 1993 - Lionel Parrott, September 1994
- Design and Technology - A Centre of Excellence - Report on St Michael's Grammar School by D & H Marsden, 1994

VIS BGA also publish regularly a Facilities Update Letter - Numbers 1 to 4 inclusive Nov 1991 to September 1993 are available.

ICAC Independent Commission against Corruption - Monograph on Tendering and Purchasing called

Pitfalls and Probity - Case Studies. ISBN 0 7310 0241 5
published June 1993

NSW Government Public Works Department

For comprehensive help in **asset management** schools will find much help in the **Total Asset Management Manual** published by the New South Wales, Public Works Department, Policy Division.

The manual contains articles on Economic Appraisal, Value Management, Post Completion Reviews, Capitalisation Guidelines, Risk Management, Life Cycle Costing, Asset Register Guidelines and Energy Management.

There is a companion manual equally informative referred to as the **Capital Project Procurement Manual**. This manual deals with Codes of Practice, Tendering in relation to construction projects, Various aspects of the culture relating to the construction industry such as quality assurance, Relationship management such as Contracting, Planning in particular relating to the construction program and Management of the construction consultants.

These Manuals can be obtained through the NSW Public Works Department, Asset Management Policy Unit, McKell Building, Rawson Place, Sydney. Phone (02) 372 8877.

9.8.Government Capital Funding Schemes

Commonwealth Government Capital Grants Program

The Commonwealth Government operates a capital grants program which makes funds available through the various Block Grants Authorities (see list in Appendix 9.3) funds for capital projects.

When applying for capital grants certain limits apply governing eligibility, these are referred to as "globals" or global area guidelines. This is a measure of area in relation to pupils enrolled. For every Primary student there is an allowance of 6.13 sq m and for Secondary students 9.75 sq m.

As grants are applied for in advance the forecast enrolment is used to determine the global area entitlement.

Refer section 3.1.3 for more detail.

Room Count considerations

Each Block Grant Authority will have its own guidelines and schools should determine what these are prior to seeking a grant.

The AIS Block Grant Authority in NSW applies a room count check as follows:

- Each primary class will be eligible for a classroom.
- In Secondary schools the following formula is used to determine the number of rooms.
  - ✓ Number of English classes multiplied by a factor of 1.4.
  - ✓ This gives the number of secondary class rooms the school is entitled to.

Adapt to changing needs

There is scope for making concessions in relation to the above guidelines for particular situations, particularly where schools are in a growth phase.

A school requiring seminar/discussion spaces could have more classroom spaces than the formula suggests, while still keeping within the globals guidelines.

Design for growth

It is not always appropriate to construct all facilities at once particularly where funds are limited. Indeed funding formulae for Commonwealth Grants programs limit the amount of building that can be provided under the program.

The formula relates numbers of children to total building area as a maximum for that particular stage of growth.

Global guidelines

NSW State Government Refer Appendix 9.9 where NSW Interest Subsidy Scheme is outlined

9.9. State Government Assistance Schemes

New South Wales

The NSW Government provides financial support for schools who borrow money to construct school buildings provided those buildings conform to space allocation guidelines consistent with space provision for state schools. This support is available through the NSW Government Interest Subsidy Scheme. The guidelines as to space allocation as well as the financial constraints are documented in a booklet available to schools from the Director of Finance of the Department of School Education, 2-10 Wentworth St, Parramatta 2150. Projects not requiring this subsidy can ignore these guidelines but as the support is substantial this is not recommended. Although the school may not wish to pursue this resource at present the option should not be ruled out for later stages. For this reason the NSW State Government Interest Subsidy guidelines on area are relevant for NSW schools.

This scheme has another constraint on eligibility - the number of loans and the size of loans which a school can take within a defined period and still attract subsidy. The scheme should be carefully studied before settling on final plans if the maximum benefit is be achieved for the school.

State Government Support in other states

Victoria

The Victorian government makes available each year approximately $1m which is administered through the Catholic and Independent Schools BGA's.

Applications for subsidy is made each year. The guidelines include:

- subsidised loans not to exceed 10 years duration
- maximum subsidised loans is $400,000
- maximum of two years subsidy with maximum subsidy of $5,000 each year
- no interest subsidy in case of Commonwealth Capital Grants

Queensland

The Queensland Government assistance is by way the State Capital Assistance Scheme - a capital grants program which replaced an Interest Subsidy scheme which operated up to 1991.

The funds are allocated on the basis of educational and financial needs by the Queensland BGA's.

South Australia

The State Government has provided support for the non-government school sector by way of joint developments with the Government sector and private developers in such ventures as

the Aberfoyle Park and Golden Grove ventures. No other state assistance scheme exists apart from access to loans from state funds for boarding facilities in remote areas. The government is considering a program for assistance to schools in developing areas but this has not yet commenced.

Western Australia

The State Government provides funds through the Low Interest Loan Scheme (LILS) to assist non-government schools to provide facilities as a similar level and standard to those provided in government schools. There are limits on the size of loans to which the scheme applies and these limits vary according to the level of education offered (grades) and whether the school is new or existing.

The applications must be made and approved before entering into a commitment in respect of the project.

Applications are made to the WA Office of Non-Government Education prior to 28 February of the year prior to the financial year in which the loan funds are required by the school. In the case of certain school systems, applications are made through the relevant system office.

Tasmania

Tasmania has a Loan Interest Subsidy Scheme. Eligible loans are those taken out for eligible capital expenditure relating to

- acquisition of land
- erection, alteration and extension of buildings
- installation of essential services

Interest only loans are not eligible.

Applications are to be lodged with the Department of Education and the Arts by early December and annual renewals are to be submitted each April. Further details from Finance, Facilities and Planning Services of the Department of Education and the Arts.

9.10. Cape Byron Steiner School Sewerage Treatment System

When a site for a school is ideal except that there is no access to town sewer the problem may be overcome by installing an on-site sewage treatment facility as was done at the Cape Byron Rudolph Steiner School, Ewingsdale on the north NSW coast.

The system comprises the following elements

- gravity drainage from amenities to primary treatment in septic tanks
- gravity drainage to one of five sealed Stage 1 transpiration beds (fluid is directed to one other by manually operated distribution box - different one each day) as secondary treatment.
- gravity drainage to a series of five sealed Stage 2 transpiration beds. The transpiration beds are described below.
- overflow from these to a polishing bed planted with papyrus, canna and typha. This is more or less an experimental section to try out other plants which might thrive in a high nutrient situation.
- overflow to retention pond (bottom sealed to protect ground water)
- by irrigation pump either to irrigation system or the flow-form structure which provides additional aeration and water then flows back into the transpiration beds and through the whole cycle again.

Transpiration Beds

These are "boxes" with concrete sides and sealed bases over which is laid a series of layers of gravel, aggregate of various sizes, metal dust and sand. Into the sand is planted a special kind of plant which uses a large amount of water and is capable of thriving in the effluent. This plant is called "Phragmytes Australis" - a native reed found in tidal swamps, which has a great appetite for high nutrient compounds.

Use of output for Irrigation

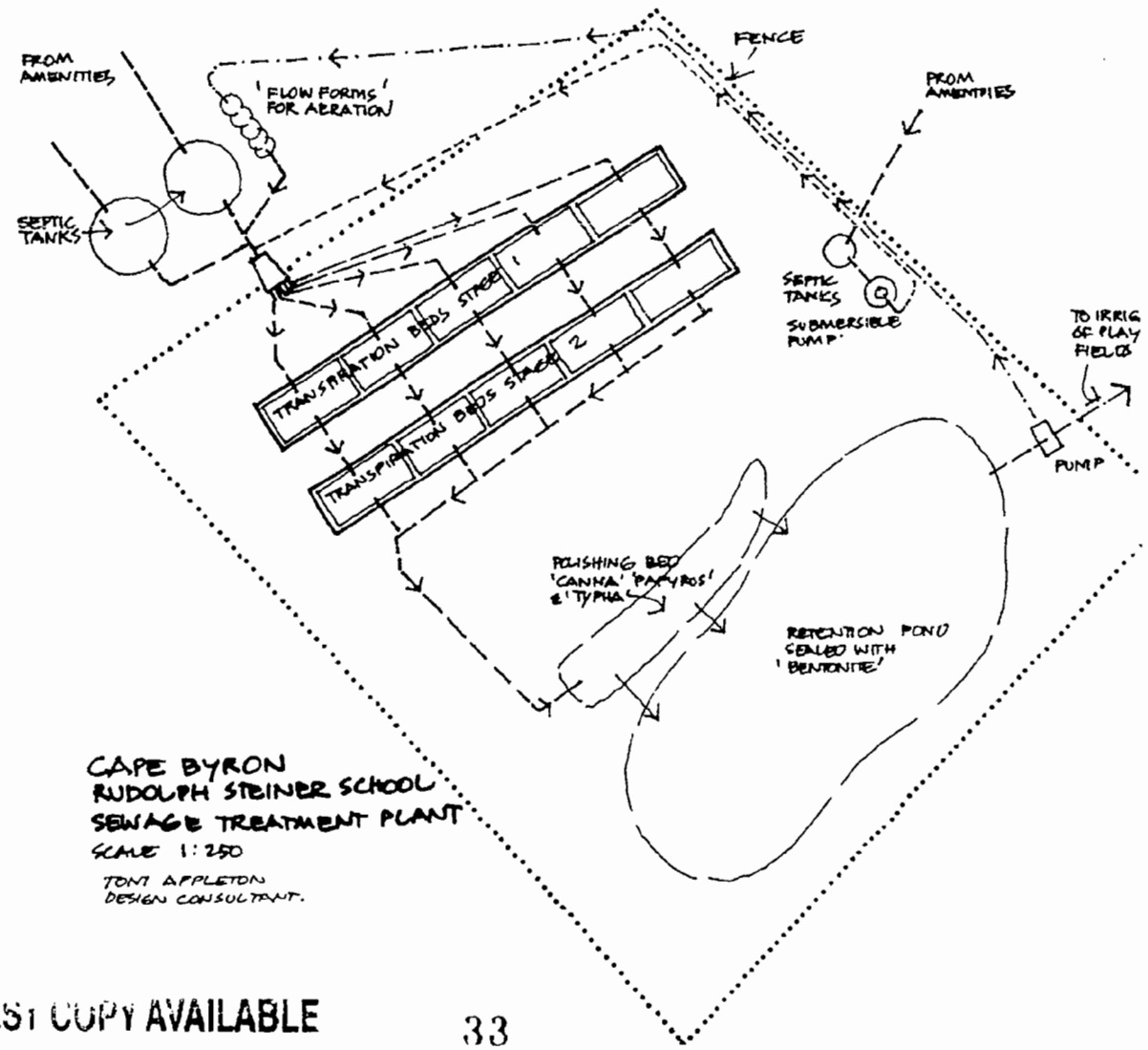
The use of such treatment of water to be used for irrigation is subject to approval of the Environmental Protection Agency.

Schools planing to use such a system will need to have detailed discussions with the local authorities and should anticipate stringent controls and monitoring, specially in the early phases of its use. Check before purchasing the site.

Safety and Security

The system must be fenced of from play areas to be used by school children and the community generally.

Berms (mounds) need to be established to ensure there can be no escape of untreated sewage into community use areas.



9.11.Anti Graffiti Method

For a variety of reasons schools are the target of graffiti - that is defacing a buildings interior or exterior, usually the latter, with spray paint, crayon, lipstick, posters or paint.

The most common is spray painted symbols based on a code name identifying the person applying the graffiti known to the local "crowd". The object is to be "seen" by as wide a group as possible.

The defence against graffiti involves one or more of the following strategies:

- locating vulnerable surfaces - those exposed to the public - away from immediate accessibility. This can be done by establishing shrubbery or other barriers immediately in front of these vulnerable surfaces
- treating the surface so that spray paint will not adhere or will be easily washed off
- placing the area under surveillance cameras
- creating a surface which is not easily painted or to which posters can not easily be adhered to - e.g. a heavily textured surface
- regular maintenance - experience shows that when signs are immediately dealt with the attractiveness to graffiti artists is significantly diminished

Wall treatments

A number of treatments are available for reducing the adhesion characteristics of walls such that graffiti can be more easily removed:

1 Choice Anti-graffiti - a treatment employing vegetable wax extracts which leaves the surface apparently untreated - no glossy lacquered appearance according to the manufacturer - Choice Chemical Distributors Pty Ltd

2 Wall-Tech AG suitable for both concrete, brickwork, masonry or stone.

3 Neoferma anti-graffiti sealer - WB manufacturer can be contacted at Suite 15, 32 Campbell Av Dee Why 2099.

9.12.Project Management Guidelines

The AIS BGA Limited have published "Project and Construction Management Guidelines" a copy of the current version follows:

AIS NSW BGA Limited

PROJECT AND CONSTRUCTION MANAGEMENT GUIDELINES

Project Management:

Project Management in this document is to be understood to mean the process of managing a building project through all of its stages ie. from the initial request of a school for a building to the final completion of all accounts including, on the way through, the appointment of consultants, preparation of budgets and sometimes even arranging the finances. In most cases the school governing body undertakes this work.

Part of this process involves the actual construction work. This may be done in a variety of ways. Sometimes by calling tenders and entering into a contract with one of the tenderers, often referred to as a "Lump Sum Contract" which may include provision for cost increases. Another method is sometimes call Project Management. In this document it will be called **Construction Management** for reasons which will become clear.

The way a "Lump Sum Contract" operates is as follows. The school community agrees to pay an agreed sum for a building described in a set of contract documents. Once the contract is signed the builder then proceeds with managing the construction and the savings he can make sometimes offset any unexpected additional costs and provided the contract does not allow him to charge for those additional costs then he gains or loses depending upon the accuracy of his initial estimate.

It can be argued, in some circumstances where a school governing body has available to it the required expertise that Construction Management is a viable option with resultant benefits to that school. These benefits should be capable of being clearly defined.

Construction Management should only be considered if the school has such expertise and personnel already within its organisation or is able to supplement already existing skills with readily available consultants who will be available over the likely period of the project.

If the school governing body does not already have some expertise in these matters the traditional method of calling for tenders with its well known safeguards is to be preferred. One real danger of Construction Management is that if adequate skills are not available to properly contract and control a project, costs can escalate and the whole project (and possibly the school) is therefore placed in jeopardy.

Construction Management may provide more control on end cost and may also shorten construction time, however this can only be assured if effective means are used to monitor the project on a regular basis and this may mean week by week.

AIS NSW BGA Limited, Project and Construction Management Guidelines page 2

Another advantage of Construction Management is that design changes which often do occur can be made without penalty. Experience shows that such changes in the context of a lump sum contract often result in additional costs to the proprietor or schools. Construction Management can sometimes can avoid these costs or at least allow the flexibility to offset them. This does not mean that a school should assume it can take short cuts in the planning process.

A successful project using Construction Management depends on the ability of the Construction Manager to estimate final prices accurately and to keep tight control on costs as the project proceeds. The estimate needs to take into account the tendering climate in the district, and the monitoring needs to be done methodically and regularly.

The AIS NSW BGA is prepared to consider requests from Schools for Construction management provided the following conditions are met:

1. A detailed costing of the project is to be prepared and approved by AIS NSW BGA Limited. Each proposed package or contract is to be costed. This will generally mean more than each trade being costed. For example a project costing around $1m may be broken up into 50 or 60 elements or packages.

   For example the trade called "Concrete" should be broken up into packages such as Formwork, Ground Treatment, Reinforcement Supply, Reinforcement Fixing, Concrete Supply, Concrete Placing and Curing. Furthermore the individual "packages" will need careful definition to ensure that there are no gaps. For example "formwork" will have to be defined to include removal and stripping and co-operation with trades for penetrations and the like.

2. The administrative aspects of the contractual process need also to be carefully analyzed and allowed for eg: insurances, Council and approval of other authorities. These costs need to be provided for in the overall costing by the school.

3. Suitable software be obtained for regular review of the variations, additional work, contract price against budget, inflation (if any contracts are let with an inflation clause), payments made and balance to be paid, all compared package by package to the original budget. This can be based on most simple spreadsheets. A copy of the proposed spreadsheet is to be provided before approval of Construction Management can be recommended. An example of an acceptable spreadsheet is attached.

4. Regular monthly reports including a copy of the updated spreadsheet is to be given to the school governing body and made available on request to the BGA. No work is to commence until the budget is agreed by the BGA. A copy of the spreadsheet with any explanations will be required

AIS NSW BGA Limited, Project and Construction Management Guidelines page 3

5. On completion the BGA may require access to a copy of each of the signed contracts and a statement as to the variations that have led to the final contract amount shown in the spreadsheet. At any time the BGA may require to view the current status of contract documents.

Construction Manager

The employment of the Construction Manager should be predicated on proven ability in addressing the above requirements. It is not considered appropriate that this work be undertaken on a volunteer basis, except in very small projects. The work, if done in an appropriate manner will require regular attention. it will be obvious that if time is not spent in this area then the expected cost savings will not be forthcoming and indeed the project may finish being more expensive that what may have been achieved under a lump sum contract.

For the employment of the Construction Manager it is considered appropriate that candidates be selected after public advertising for registration of interested parties, even in those cases where a preferred person or firm is already known.

Contract Documents

The Construction Manager will need to prepare suitable contract documents for the various packages of work. Proven ability in this area is essential. There are two basic documents. A copy of each of the proposed contract documents must be supplied to the BGA before approval can be given.

The first of these will set out the responsibilities of the various suppliers and trades and describe in detail the extent of the work. In addition the relationship to the various contractors and the client and the role of the Construction Manager in these will need to be defined in another contract document.

The second will set out the relationship between the Construction Manager and the school governing body. His fees, responsibility for cost control, the degree to which he can commit the school are all aspects that will need to be dealt with in such a document.

It is sometimes a characteristic of such arrangements that the Construction Manager will be entering into contracts on behalf of the client. If this is the case then the client will want to be very sure that there are effective limits on what the Construction Manager can commit the client to. On the other hand it may be that the Construction manager only recommends and the client enters into contracts directly with the various contractors.

Project Manager

The AIS NSW BGA will be regarding the School/Approved Authority as the Project Manager responsible for the costs of the whole project including the construction

costs as well as the costs for Consultants. A similar budget and control software should be prepared for these aspects of the project.

Organisation Chart

It is recommended that an organisation chart be constructed to clearly define the relationships which exist between all parties. This chart is to be used to establish role definitions included in the various contract documents.

Contract Limits

The Commonwealth guidelines require public tendering for all contracts over $100,000. This requirement can be met by calling for registration of firms interested in tendering and giving documents for pricing only to those considered to be capable of doing the work.

Most contracts let under a Construction Management arrangement will be less than this in which case the Commonwealth requirement to call 3 quotes will apply.

In all cases where quotes and public tenders or registrations of interested parties are called, proper documentation of the advertising and the actual quotes received needs to be maintained. originals of all documents must be kept for review by the NSW AIS BGA representative at anytime up until the final grant monies are paid out.

Summary

In summary, the AIS NSW BGA minimal requirements for Construction Management are:

1. A detailed description of the "exceptional" circumstances which the school considers warrant Construction Management rather than the Lump Sum tender:
   - outline of the benefit/losses
   - outline particular building circumstances in the district which lead to the request for approval of Construction Management.
2. Organisational Chart for the proposed Construction management (see example)
3. A detailed description demonstrating the capacity of the school governing body to manage the project in the way being proposed.
4. Details of fees to be paid to the Construction Manager and of his responsibilities and duties (including the limits within the construction Management must operate - to what extend may he commit the school's governing body)

AIS NSW BGA Limited, Project and Construction Management Guidelines page 5

5. Assurance that public tenders will be called for all major elements of the project above $60,000 and three quotes obtained for all other aspects of the project.

6. A public invitation for the registration of interest to be called from project or construction managers.

7. Records of all assessments, tendering arrangements and results, payments and accountability processes to be available to the BGA.

8. A detailed costing of the project to be prepared and approved by the school governing body. Each proposed "package" or contract is to be costed.

9. Suitable computer software to be obtained for regular review of the contracts as they are let, the variation which take place, inflation (if any contracts are let with inflation clauses) payments made and balances to be paid, all compared package by package to the original budget (see attached sample spreadsheet)

10. No work to commence until the budget is prepared.

11. Regular monthly financial reports in the above formnat to be provided to the school governing body and available to the BGA on request.

12. On completion, copies of each of the signed contracts and a statement as to the variation which have occurred and let to the final contract amount shown on the spreadsheet, to be available to the BGA if requested. At any time the BGA may require to view the status of the contract documents.

13. Suitable contract documents will need to be prepared; one to set out the responsibilities of the Construction Manager to the school governing body and the other between the school governing body or the construction manager acting on its behalf and the various contractors, suppliers or trades. Again copies of these should be available to the BGA on request.

14. The BGA will be regarding the school governing body as the Project manager, responsible for the costs of the whole project. A similar budget and cost control mechanism, probably best provided in some form of computer software should be prepared for those aspects of insurances, Council and other fees and approvals.

Attachments:

R.E. WHITFIELD
Secretary AIS NSW BGA Limited

9.13.Typical Contract Documents

Any significant building project requires careful assembly of the agreement between the builder and the client. Standard contract forms are available prepared by the Standards Association of Australia, The Royal Australian Institute of Architects and Master Builders Australia. These documents have varying emphasis and application and advice should be sought as to which document best applies.

Standard contract forms provide for the following situations:

- where the school engaging a project manager
- where there is no architect to administer the contract
- where there is an architect engaged to administer the contract
- where there are bills of quantities
- a lump sum contract
- a lump sum contract with provision for rise and fall in prices
- a cost plus contract - where rates might be agreed for the work to be done but the amount of work has yet to be established (suitable for alterations work)
- where the contractor is engaged to both design and construct

Some of the contracts in general use available from the Royal Australian Institute of Architects are:

JCC SERIES OF CONTRACTS produced by the Joint Contracts Committee of the Royal Australian Institute of Architects, Master Builders Australia , Incorporated and the Building Owners and Managers Association of Australia. The contracts are:

- ✓ JCC-C Projects with Bills of Quantities and without Staged Practical Completion
- ✓ JCC-D Projects without Bills of Quantities and without Staged Practical Completion
- ✓ JCC-E Projects with Bills of Quantities and with Staged Practical Completion
- ✓ JCC-F Projects without Bills of Quantities and with Staged Practical Completion

An important feature of these contracts is the provision for "risk-sharing" between proprietor (school) and builder.

SBW2 LUMP SUM CONTRACT

This form of contract is intended for new building works and alterations of a simple nature where the owner (school) has appointed an architect and where bills of quantities have not been prepared.

ABP-1 ADMINISTRATION BY PROPRIETOR CONTRACT

This is a lump sum contract intended for building works of a relatively small scale between a proprietor (school) and a builder where an architect may have prepared the contract documents but is not providing contract administration services.

Some of the contracts in general use available from the Master Builders Association of NSW and probably similar organisations in other states are:

E5B LUMP SUM CONTRACT devised by MBAUST and RAIA contains important provisions regarding instructions by the architect to the builder and sets out their respective rights and responsibilities. This is suitable for use whether or not there are bills of quantities.

AS2124 GENERAL CONDITIONS OF CONTRACT a contract format devised by the Standards Association of Australia for major building works where a superintendent will administer the contract with/without bills of quantities.

There are many other forms of contract available and some of those available from the RAIA are also available from the MBA and vice versa.

9.14.Check List

DBM (south Australian Department for Building Management) is a South Australian Government instrumentality responsible for arranging the design and construction of buildings for government agencies.

They have, as part of their role produced a very comprehensive design check list referred to as a "School Planning and Building Information Checklist". It is a guide to planners and designers of Government Schools in South Australia, and has been developed in conjunction with the South Australian Department for Education and Children's Services, to meet their requirements..

An abbreviated check list, and modified to be more generally applicable to the wider readership based on the DBM document follows:

SCHOOL PLANNING AND BUILDING

INFORMATION CHECKLIST

This document is a checklist which Master Planning Teams can use in the collection of data and preparation of design briefs for school projects. It is derived from and based on a document with a similar heading produced by DBM in Adelaide, with permission.

Air Conditioning

Generally all teaching spaces and offices are to have minimum heating and cooling to provide relief from extremes of temperature in accordance with Government policy.

See also **Heating Cooling and Ventilation**

Acoustics

Ensure good sound insulation between classrooms, taking care to insulate over walls through ceiling spaces.

Use acoustic ceilings where there are hard floor surfaces such as vinyl and are otherwise noisy.

Bag Storage

Under cover near entries but not obstructing clear access.

- Primary

Associated with general learning areas to accommodate bags for 80% enrolment.

- Secondary

In areas where students can access them at class break times without impeding access - allow for 100% enrolment.

Bench heights	Primary	Student bench height 720mm. Consider some at 850mm for staff use
	Secondary	Student bench for seated use 720mm, for standing use 850mm
	Staff areas	as for Secondary
	Wheel chair users	720mm - allow for clear knee-space under

Blackout See **Curtains, Blinds and Blackout Provision**

Blinds See **Curtains, Blinds and Blackout Provision**

Bicycle Parks

Visual supervision from teaching area desirable

For Primary schools	15% of enrolment
For Secondary schools	10% of enrolment

Galvanised steel posts concreted into ground

(These percentages may be reduced as bicycle use is decreasing generally.)

Canteen

Provision to include counter and servery hatches, double bowl sink and drainer, hand basin, exhaust fan, telephone point and adequate power points (may require 3 phase power for heating/cooking)

Walls plastered and painted with gloss enamel

Floors - sheet vinyl with welded joints - some authorities may require welded coving under benches.

Flyscreens to opening - windows

Security grilles on doors and windows.

Security alarm system inside

Servery hatches to have heavy duty industrial roller doors with additional locks

Consider a grille on outside as well

Allow for delivery truck access.

Car parking

Allow one car-park for each staff member plus 5 visitor spaces minimum - (local authorities may have other formulae).

Include security and area lighting.

Allow at least one space for wheel chair users (wider than others - 1.5 standard spaces)

Consider need for student parking and including adult re-entry

Clocks

Wall mounting to be provided by contractor with flush electrical outlet unless battery clocks are to be provided.

Electrically operated clocks to be provided in dark rooms.

Coat Storage

Coat hooks to be provided in corridors near learning areas - under pelmets to protect students from eye injury - at a height to suit the students ages.

Compactus Units

Allow for one adjacent to staff areas for text book storage - take account of heavy loading in structural design.

Computer rooms

Adequate power outlets (preferably uninterrupted power supply - if not at least a circuit protected from electrical surges and spikes) with wall ducting 1000mm above floor in specialist computer rooms.

Ceiling and floor power ducts can be considered - avoid power cords across floors.

Lighting, window treatment and ergonomics to Australian Standard for use of Screen Based Equipment

Security grilles on windows and security locks on doors.

Consider special design of benches and tables to suit computers and learning methods.

Cooling

Refer to **Heating Cooling and Ventilation**

Curtains, Blinds and Blackout Provisions

Curtains or blinds are not normally provided as part of any building contract except as follows:

Blackout provisions are required in Secondary schools as follows:

Photography	no windows to dark room
Drama	either no windows or blackout curtains (allow for ventilation

Dim out provisions required as follows:

Primary schools	Drama/multi purpose rooms
Secondary schools	Physics Laboratory
	Social Sciences/Humanities Room
	Environmental Design room

Data Cables

Consider need for data communication around school. Provide conduits between buildings, and in wall and ceiling cavities to teaching areas.

Disabled Persons

Make provision in new schools and major upgrading to accommodate physically disabled persons including wheel chair users including the following

ramps and paving to allow at-grade access to entrance doorways and between buildings – minimum 1in 14

adequate width doorways (840 minimum clear opening)

wheelchair toilets – refer Australian Standard

appropriate height benches in specialist spaces

lift to upper floors or ramps using natural landscape as far as possible

dedicated car-spaces

lever handles to doors and taps

lever arms to taps and mixer valves for hot water

Refer to Australian Standards

Door Hinges

External doors to have fixed pin hinges and preferably security hinges such as Lanes Security Butt hinges or Chubb Security hinge bolts

Pivot hinges not generally recommended.

Door mats

Removable washable mats can be fitted inside all external doors on vinyl or inset in carpet.

Metal foot scrapers should be provided where soil likely to be carried on shoes.

Door stops

Provide to all internal doors where necessary to prevent damage to walls or joinery.

Consider solid metal types with rubber buffers, fixed to floor.

Doors

External doors not protected by verandahs or wide overhangs should be metal clad for weather protection.

All external doors should be solid core and weather resisting.

All glazing in doors must be laminated safety glass. - Consider use of material such as Lexan to minimse breakage in high resk areas.

Kick plates should be provided on doors in heavy traffic areas.

Air-relief grilles must be substantial and fixed so as not to compromise security.

External doors should have door closers, pull handles and deadlocks (not lever furniture), and door seals for weather protection.

Roller doors to have additional hasp and staple security protection.

Sliding doors are not favoured as external doors.

Door closers to main external doors should have hold open function.

Door handles to be return lever handles - heavy duty quality

Drinking Fountains One drinking fountain per 30 pupils up to 150 and one per 50 thereafter - check local authorities

Dust Extraction Technical studies workshop in Secondary Schools should have dust extraction to requirements of industry authority

Electric Lighting Refer to **Lighting**

Electrical Installations Residual Current Devices to be installed in switchboards to Art, Technical Studies, Computing and Science areas in Secondary Schools and in Ground staff workshop and stores. (Generally to circuits where students use electrical equipment)

Fire Extinguishers Refer **Fire Fighting Provisions**

Fire Fighting Provisions Consult with local fire safety authorities – this is an area where professional advice in consultation with appointed authorities are needed to determine requirements in respect of the following:

- Fire hydrants
- Fire Hose Reels
- Fire Extinguishers
- Fire Blankets

Flagpoles Provide at least one in a prominent area for ceremonial occasions

Flammable and Corrosive Materials Storage To be provided in Secondary Schools in Art, Technical Studies and Science Chemicals areas:

Art and Technical Studies	Metal Trafalgar (or similar) flammable liquids cupboard vented to the outside. One in each area – 120 or 240 litre capacity
Science Chemicals Store	Metal cupboard as above – in a store room mechanically ventilated.

Floor Coverings Generally teaching areas and offices to be carpeted 80/20 wool carpet commercial quality.

Wet areas and practical activity areas to have vinyl.

Toilets to have ceramic tiles or welded sheet vinyl.

Vinyl and ceramic floors to be non-slip surface.

Fly Screens

Fly screens to be provided to windows and doors of areas where food is prepared – Canteens and Food Technology areas. They may also be required to other windows in locations where flies are likely to be a problem.

Foot Scrapers

Provide in areas where soils are likely to adhere to shoes.

See also **Door Mats**

Furniture Provisions

Loose furniture allowance to be included in project budget.

Grounds

Allow for passive and active, structured and unstructured recreation.

Play equipment to be carefully evaluated in context of safety and school uses.

Paving in heavy wear areas and near buildings, particularly entrances.

Shade for taking meals and for shelter generally

Weather shelters – can double as assembly areas

Consider maintenance and drainage in planning

Gymnasium and Multi-purpose Hall

Plan the school in the commencement phase so that multiple use can be made of teaching spaces for example with transportable walls.

Assume that the facility of a gymnasium and/or multi-purpose hall will be part of a later stage.

Evaluate the use of space and design the facility so that as many different functions as possible can be conducted within the facility. Additional expenditure to achieve this may save many times that by duplicating space for other purposes if the original facility is not fully utilised.

Hand Driers

Electric hand driers for both students and staff can reduce costs of supply of paper and disposal costs. Provide only those with metal casing and automatic start/stop operation and fixed nozzles.

Handrails/Balustrades

To be Australian Standard - preferred height 1200mm.

Historic Buildings

Liaise with relevant authority in community - the local government body will have details of relevant authority and some details of particular buildings affected.

Heating, Cooling, Ventilation

Mechanical systems including air-conditioning should be introduced where necessary to alleviate extremes of temperature, not to provide stable internal conditions except where this is necessary.

Evaporative cooling is appropriate only where there is generally high temperatures and low humidity.

Heating should not be non-flued gas heating.

Natural ventilation to be provided to all occupied spaces except where it is appropriate to rely at all times on air-conditioning.

Ensure that all such systems comply with Australian Standards.

Hot Water

Provide hot water in the following areas: (minimum requirements)

Primary Schools

Basins in Staff toilets, in sick bays, toilet for disabled persons, all showers, Canteen basin and sinks and one outlet in practical activities area, staff lounge.

Secondary Schools

Basins in Staff toilets, in sick bays, toilet for disabled persons, all showers, Canteen basin and sinks, Home Science sinks and basins, photographics sinks, Art (one outlet to each room), Science areas (one outlet to each room), Technical Studies wash basin, staff lounge.

Set thermostat at 60-65°C in accordance with AS 1308.

Industrial Safety

Check with local state government authority as to application, if any of Industrial Safety regulations in workshops for both students and maintenance staff.

Key Cabinet

Instal a key cabinet in secure area, preferably the Secure Store in Administration area where at least 2 copies of all keys are retained, one to remain at all times in the key cabinet for making copies when required. All keys to be marked and a register of issue of all keys kept with the key cabinet.

Kilns

Allow for inclusion, if not initially, then at some subsequent time. Provide for gas and/or electrical connection.

Consider appropriate fume/heat exhaust.

Lighting

Fluorescent lighting (tubes or globes) preferred for all internal lighting except where feature lighting may be required for special effect.

All lamps should not be higher than 2.6m above the floor to facilitate changing of lamps. In cases where lamps are required above this level special equipment is required for access.

Mats

Provide for removable mats on the inside of external doorways - inset into carpeted areas and loose laid on vinyl areas (preferably with non-slip backing).

Mirrors

Provide for individual mirrors above hand basins in staff and student toilets. Polished stainless steel can be an advantage.

Outdoor seating

Provide fixed seating as part of the siteworks - can be integrated with raised garden beds, retaining walls shade structures and the like. Provide sufficient for students to be seated at meal breaks and for outdoor teaching areas.

Primary school seat height	325 - 450mm
Secondary school seat height	325 to 600mm

Photography sinks

In secondary school photography areas to be of stainless steel (816 grade acid resistant)

Pigeon Holes - Staff

Locate near staff lounge and printery. If possible design in such a way that pigeon holes form the wall between the staff area and administration areas for easy dispersal of literature.

Allow for one space per staff member plus 10% - calculate on maximum forecast school enrolment.

Minimum size 330 x 270 x 130mm. To hold A4 sheets and folders flat - check stationery in use.

Pinboards

Allow for at least 2 pinboards per teaching space and one in each office.

Primary	from 300mm above floor to 2100mm except where there are fixed benches
Secondary	from 1200mm above floor to 2100mm or above benches

No pinboards above sinks

Ensure pinboards do not clash with GPO's, light switches and other fittings.

Use only high quality pinboard material - cheap alternatives which do not endure are in the long run more expensive.

Playground equipment

Allow for quality equipment - fixed equipment is preferred to avoid swinging elements which can cause injury.

Rainwater tanks

Provide only in country areas where water is of poor quality or in short supply. Ensure that vermin are kept out of tanks and appropriate roof cleaning is done to ensure maximum purity of water stored. Instal filters and foul water separators in critical areas.

Safe

Instal a floor safe in administration area, preferably in Secure Store.

Safety Issues

The following issues need to be considered to ensure the safety of school users:

- Fire safety provisions of the Building Code of Australia.
- Compliance with the requirements of relevant fire safety department
- Wide aisle ways, passage ways and clear exits
- non-slip surfaces on stairs, ramps and floor tiles in toilets
- exit and security lights and emergency lights properly maintained
- avoid awning and casement windows which open at head height into walkways
- door handles to be automatic return lever handles
- separate vehicle and pedestrian traffic with bollards, fences and planting
- avoid window air-conditioning units projecting into walkways
- avoid sharp corners on joinery units
- provide protective enclosures to hot water units if accessible to staff and students.

Sanitary Disposal systems

Allow space for disposal facilities either by incinerators or serviced disposal units - one to each female toilet.

Seating

Refer **Outdoor Seating**

Secure Rooms

Allow for a secure storage rom for teaching areas, Library Resource areas and Administration areas. Characteristics of such spaces should approximate:

- internal location, avoid external walls, no windows
- concrete slab floor
- solid masonry walls, preferably cavity walls
- welded steel mesh over suspended ceilings
- steel door frames bolted to walls
- solid core doors with steel lining
- multi-lock or Chubb lock, security hinge bolts.

Security alarms

Security alarms of the silent, monitored kind incorporating intrusion and movement detectors, preferred.

The whole school should be alarmed. Ensure detectors cover all likely points of entry and movement in the building.

Each building or zone should have cypher keypad to allow de-activation of areas for after hours use.

Provide combined smoke and intruder alarm detection alarms in new schools.

Security gates

Metal gates and fences should be provided to secure internal courtyards, full height with no horizontal rails for climbing. Fit special purpose metal encased slide bolts with measures to overcome use of bolt cutters.

Security lighting

Vandal resistant light fittings to porches, alcoves and verandahs, covered ways and building corners.

Have them automatically switched by photo-electric solar switches and/or movement detectors.

Lights mounted high on walls give best security lighting.

Security on Windows

Security grilles should be provided on all canteen windows and doors. Also to computer and music room ground floor windows.

Showers

Provide at least one shower associated with staff toilet facility.

In secondary schools consider whether showers are required for sporting activities.

Sick rooms

Design door openings and passage outside them suitable for manoeuvring of stretchers.

Provide a hand basin with hot water and a toilet adjacent.

In Primary schools sick rooms are to be near the General Office to allow supervision by clerical staff.

Provide for a bed, elevated with cupboards under, bench and sink with cupboards for storage of all first-aid equipment and material.

Signage

Suggestions for inclusion in signage list:

- School name on main road frontage
- visitor car-parking entry and service vehicle access
- signs to direct to Administration and any community use facilities
- standard regulatory and safety signs (use these as teaching aids)
- male, female and wheelchair access toilets
- internal room signage as appropriate
- number every room and space for managing the key register, the maintenance programs and giving general directions to people.

Spiral Stair cases

Not permitted under safety requirements of BCA and in some states under other regulations. In any case they are not generally regarded as safe in public buildings.

Stoves

Provide a stove for cooking as follows:

Primary schoc	Staff lounge kitchenette
	Practical activity areas
Secondary school	Staff lounge kitchenette
	Home economics areas
	Consider needs of disabled persons

Single stoves to be vented to outside with range hoods if possible. In home economics area provide for roof/ceiling exhaust ventilation.

Taps and sinks

Primary Schools (required)	In art craft areas
Secondary areas (required)	In art-craft areas
	Science areas
	Photography areas
	Technical studies areas
	Home Economics/Food Technology
	Design studio

Allow staff to have input into kinds and location for the functions to be conducted in the various spaces.

Consider types of sinks appropriate to requirements.

consider water needs for other areas (serviced classrooms, Human Society and Environment etc.)

Telephones

Provide for central point for Main Distribution Frame (MDF) and for Secondary distribution frames as appropriate. Allow space for PABX system in a secure well ventilated space.

In initial installation provide wiring for future installation of telephones.

Take account of future needs for fibre-optic cabling as well as for data cabling.

Toilets

Refer to BCA as well as to educational and local health authorities for specific requirements including number required, including basins, wash points and drinking fountains.

Ventilation of printeries Where photocopying is done mechanical ventilation is required to dilute ozone emissions. Locate photocopier near exhaust fan.

Where offset printing is done mechanical exhaust systems designed by engineers are preferred.

Waste disposal Discuss with local health authorities - allow for enclosure, washing of receptacles, truck access, sorting of refuse for recycling.

Water supply Check availability and adequacy of water supply especially water pressure for irrigation of playing fields and for fire main requirements.

Acknowledgement:

This information has been prepared with much appreciated assistance from

Andrew Tidswell
Supervising Architect - Education
South Australian Department for Building Management

9.15. Construction Consultants

This is a list of the various kinds of consultants that might be used by schools in the development of a building and site development project.

List of practitioners can usually be found by contacting the local professional organisation or association.

Consultant	Role Description
Architects	Assist in development of client brief, documenting of building and site components of master plan, designing and planning buildings, site layout, preparation of contract documents including drawings and specifications, and usually oversight and coordination of the team of design and documentation consultant team. In addition - oversight of the construction phase of the project - managing the contract on behalf of the client (school).
Consulting Engineers	Consulting engineers are many and varied in the expertise they offer. Some firms are multi-disciplinary. They may offer design only but usually the documentation for contract purposes as well as part of the overall documentation team. Not all these kinds of engineers are required on every project.
Civil	Design of major earthworks, roads and major site constructions such as bridges, dams, stormwater detention systems.
Geotechnical	Analysis of the foundation material for buildings and site structures and preparing reports for use by the structural and civil engineering consultants.
Structural	Design of the structure of a building, its floors, walls, columns, retaining walls, roof structures. Assessment of structural stability of existing buildings is another aspect of their work.
Electrical	Design of the electrical systems of the building and site including the main power supply. Forecasting the anticipated electrical loads for design of local power grid.
Mechanical	Design of the air handling systems, both ventilation (exhaust and supply) and air-conditioning. Design of lifts and hoists and other materials handling systems
Hydraulic	Design of roof, site and sewage drainage systems, cold and hot water supply systems, fire suppression such as hose reels and hydrants and sprinkler systems (rarely required in schools). Water heating devices including solar water heaters.
Acoustic	Analysis of acoustic environment both noise from community into the site and its impact on the internal environment as well as "room acoustics" - the anticipate performance of spaces where acoustics is critical e.g. halls and music rooms. In most cases the performance of classrooms is well within the design capacity of the architect who receive training in this area of design.
Land Surveyors	Analysis of site conditions as well as documenting existing landforms to assist the designers in their work. They provide information on the title of the land and assist where sub-division may be required. With modern equipment computer the information from an analysis of site can be supplied in computer format direct to other consultants for integration with design processes where computer aided design is being used.

Quantity Surveyors	Analysis of cost and amount of materials and labour to be used in the project. The involvement from the beginning assists greatly in forecasting costs. Their major input is seen in the preparation of a document called Bills of Quantities, but their most significant contribution is in the area of cost management.
Interior Designers	Appropriately qualified interior designers can assist greatly in forecasting impact of choice of materials on the interior environment and its use over time. Their training is in the area of colour, human reaction and response to various materials, light quality and durability. Their contribution is most often incorporated in the architects documents although they may be employed separately to prepare colour schedules and fabric selection including floor materials.
Town Planners	Their training is in the area of town planning laws and zoning, understanding and applying principles of micro-geography and negotiating with local and regional planners. They are not usually employed in the detail design of schools but may assist in projects where there is an intention to coordinate a community centre with a school in shared use of facilities.

9.16. Financial Consultants

As has been indicated throughout this document the Master Planning process should be attempted only after the school authority has put in place a comprehensive Financial and Educational Plan. It is anticipated that the school staff will have access to the necessary expertise in order to deal with the latter.

The following are firms with whom contact was made in the course of preparing this document. They are examples of those who are providing Financial Planning advice to schools.

Pizzey Noble Pty Ltd
Level 2, 19 Cato Street
Hawthorne East, Vic 3123
Phone (03) 9822 8033 Facsimile (03) 9822 8539

Pizzey Noble is a company which provides management and consultancy services in response to client needs. Expertise in project management, master planning, strategic and financial evaluation to educational institutions is one of their specialties. Pizzey Noble operates nationally. Contact Mr Allan Pizzey

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Educational Finance Services Pty Ltd
5 Pannikin Street
Rochedale South Qld 4123
Phone (07) 3841 2847 Facsimile (07) 3841 2304

Educational Finance Services has provided a consulting service to independent schools and colleges since 1989. The company acts as consultants to more than 90 schools throughout Australia. The company provides specialised education and financial services to schools in strategic planning and management including capital grant submissions, ERI analysis and all government related matters. Contact Mr Peter Hollett

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Grant Thornton Consulting
Level 15, 1 Market St
Sydney 2000
Phone (02) 284 6666 Facsimile (02) 267 4000

Grant Thornton is a national and international accountancy firm providing a comprehensive range of business advisory services to a wide variety of clients. Their client base includes a number of educational institutions. They aim to help their clients' businesses grow through better business and planning practices.
Contact Mr Mark Taylor

9.17. Contributing Consultants

The following list is provided as a resource for schools based on information supplied by various consultants who have contributed information for incorporation in the Guide Document.

Bruce Allen and John Courmadias Pty Ltd, Architects
27 Niagara Lane, Melbourne 3000

Toni Appleton, Architectural Design
Mafeking Road, Goonagerry via Lismore NSW 2480

Paul Archibald Pty Ltd, Architects
2a Miln Rd, Box Hill North Vic 3129

Andrew Blamey Architects
2b Azalea Grove, Pennant Hills 2120

Brown, Falconer Group Pty Ltd, Architects
255 Magill Road, Norwood SA 5069

Burling Brown and Partners Pty Ltd, Architects
PO Box 930, Southport Qld 4215

John Carr and Associates, Architects
198 Marius Street, Tamworth NSW 2340

Forward, Viney, Woollan, Architects
33 Little Bourke St, Melbourne Vic 3000

Clarke, Hopkins and Clarke, Architects
2a Bridge Road, Richmond, Vic 3121

Peter G Lyall and Associates Pty Ltd, Architects
1/1057 Burwood Highway, Ferntree Gully Vic 3156

Geoff Nairn Architects
44 Tynte St, North Adelaide, SA 5006

Noel Bell Ridley Smith and Partners Pty Ltd, Architects
2 McManus St, McMahons Point NSW 2060

Don Roderick - Architect
8 Hanna St, Mt Ommaney Qld 4074

Stanton Dahl, Architects
18 Oxford St, Epping NSW 2121

A K W Architects Pty Ltd, Architects
Suite 56, 2 O'Connell St, Parramatta NSW 2150

Norwich Project Management Group,
Project Management and Planning Consultants
14a Mansfield Road, Galston NSW 2159

Gerald Hanscamp BArch Architect
1588 Burwood Highway, Belgrave Vic 3160

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